

XXXVIII. *An Account of the remarkable Cold observed at Glasgow, in the Month of January, 1768; in a Letter from Mr. Alexander Wilson, Professor of Astronomy at Glasgow, to the Rev. Mr. Nevil Maskeline, B. D. F. R. S. and Astronomer Royal.*

Reverend SIR,

College, Glasgow, May 29, 1771.

Read Nov. 7, 1771. **H**A VING of late had some leisure time, I have made out from my minutes, a detail of the remarkable cold which prevailed here in the month of January, 1768; the intensity of which being so extraordinary for this climate, an account of it may perhaps be thought worthy of a place in the Philosophical Transactions.

Whilst in bed, on Sunday morning, January 3, 1768, about 8 o'clock, it felt somehow unusually cold. A little while after, on reaching out for a decanter which I had placed near me the preceding night,

night, with some water in it, I was surprized to find the surface of the water frozen over, the like not having happened before in that place. Upon this, I desired my son to try the cold by a thermometer, as I imagined it behooved to be very intense. The experiment was soon after made, by exposing a thermometer at a high North window, and free from the walls of the house; in which situation it had not remained for a quarter of an hour, when we found the mercury had fallen so low as to 5 deg. of Fahrenheit's scale.

Although I had expected a great degree of cold, yet I was not quite prepared for so extraordinary a report as that which the thermometer now gave me. My doubts were, however, soon settled, by examining matters with more attention, and by finding the first thermometer verified by my standard one, which was now hung out beside it.

Being thus satisfied that there was no fallacy in this preliminary observation, it naturally occurred, that the cold, however intense it now was, might have been much more so at some earlier hour of the morning. But how to ascertain this, and to recover the lost observation, was the difficulty. In the eagerness of our disappointed curiosity, we were disposed to magnify this golden opportunity, which had now escaped us, and to reflect upon it with regret, when luckily a little invention helped us out. A notion suggested itself, that, if we went very warily to work, we might perhaps surprize those imagined colds still lurking under the surface of the snow, which at that time lay thick upon the ground.

I need not mention upon what principles of the heating and cooling of bodies this expectation was founded, as they will readily occur of themselves. The fact was, that I immediately repaired to the fields, and sought out a low place, upon which the sun had not then risen; here I laid the thermometer in the snow, almost upon the very surface, when presently the mercury sunk from $+6$ deg. to -2 deg. which therefore I concluded to have been pretty nearly the coldest temperature of the air over night.

The next thing was, to make regular observations with the thermometer, so long as the cold promised to continue remarkable. The instrument was hung upon a pole near to the observatory, and to the windward of it, care having been also taken to keep it under a proper shade, so long as the sun shone out.

Register of the Thermometer, kept at the M^r Farlane observatory, of the college of Glasgow, on sunday January 3, and monday January 4, 1768.

Sunday	10 o'clock	$+ 5$ deg.	
morning	11	7	
	12	9	
afternoon	1	10	The temperature of the snow on sunday morning, at about ten inches below the surface, was near to 30 deg.
	2	11	
	3	$9\frac{1}{2}$	
	$3\frac{1}{2}$	$6\frac{1}{2}$	
	4	$3\frac{1}{2}$	
	$4\frac{1}{2}$	2	
	5	$1\frac{1}{2}$	
	$5\frac{1}{2}$	$2\frac{1}{2}$	
	6	$1\frac{1}{2}$	
	$6\frac{1}{2}$	$0\frac{1}{2}$	
	7	—	
	$7\frac{1}{2}$	—	

	8	—	0 $\frac{1}{2}$	
	8 $\frac{1}{2}$	—	1	
	9	—	2	
	9 $\frac{1}{2}$	—	1	
	10	—	2	
	10 $\frac{1}{2}$	—	2	
	11	—	2	
	11 $\frac{1}{2}$	—	1	} Some appearance of clouds in the S. E.
	12	—	0	
	12 $\frac{1}{2}$	—	0 $\frac{1}{2}$	
Monday morning	1	—	1	
	2	—	0	
	2 $\frac{1}{2}$	+	3	} Clouds gathering, and some wind from E.
	3		6	
	3 $\frac{1}{2}$		7	
	4		9	Quite overcast, wind E.
	4 $\frac{1}{2}$		10	Ditto
	5		12	Ditto

It was observable, that after sun setting, the atmosphere had a tendency sometimes to turn a little foggy, and again quickly to clear up, balancing; as it were, betwixt these two different states. It is worthy of notice, that the minute variations of the thermometer, as set down in the above register, seemed to depend upon these different constitutions of the air; the mercury always rising in the thermometer a small matter, when the mistiness came on, and *vice versa*.

In the intervals of observations, we made some other experiments, which the present intensity of the frost suggested; particularly one relating to the evaporation of ice, which was tried in the following manner. I took a square reflecting metal belonging to my own two foot telescope, and exposed it on the ballustrade of the observatory, till it had acquired the temperature of the place, which was then at 0 deg. after it

was thus cooled, I breathed on it repeatedly, till its polished surface was covered over with an incrustation of ice or frozen vapour, of a very palpable thickness. In this condition the speculum was replaced in its former situation, having its incruusted surface exposed to the still open air; when, in a little time, we found the frozen pellicle beginning to disappear at the outer edge, all around, leaving the metal quite clear. Gradually more and more of the speculum was bared in a regular progression, from the circumference towards the centre; and at last, in about 50 minutes, the whole surface had parted with its ice. This experiment was repeated when the speculum was defended from the open air, by a large thin box, with a cloth over it. The event turned out the same as before, only it required longer time.

This progress of the evaporation from the outward parts towards the centre of the speculum, was likely owing to the original plate of ice being thickest towards the center, a circumstance which might arise from the manner of fixing it at first breathing on it. Or perhaps it may be imputed to some more curious cause, and may be some effect of the repulsive force belonging to the polished surface; but this point we did not sufficiently examine into, by a due repetition of experiments. I may just mention, that, partly with a view to this matter, we exposed as above, a set of bodies, having their surfaces of different degrees of polish, and as equally covered with frozen moisture as we could judge. The result of which experiments seemed to favour the idea of the ice being less attached to the more polished surface than to the coarser. This appeared particularly in the
case

case of a comparison made betwixt the speculum above-mentioned, and the brass end or cover of the same telescope ; for the ice was found still to cleave to its surface a good while after the speculum was entirely cleared. These imperfect experiments are only mentioned by the bye, and may perhaps serve as hints to others, who may be disposed to prosecute this part of natural philosophy.

Some particular reasons have occurred, which will hinder me from transmitting to you the paper on the solar spots, till some time next winter, by which time I shall have finished every thing I have to say on that subject. Wishing to hear from you at your leisure, I ever am, with much respect,

Reverend Sir,

Your most obedient servant,

Alexander Wilson,

Professor of Astronomy at Glasgow.